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THE JOURNAL OF PHILOSOPHY

ARISTOTLE AND THE PARADOXES OF ZENO

THE title of this paper may suggest, to an age which has shaken the dust of the Lyceum from its feet, that we are here posing a "mere historical" question. This is not the case. Indeed, the discussion will concern itself, not with an exposition of Aristotle or with following the text of the *Physics*, but with as clear a statement and discussion of the central issue of the paradoxes as are possible. But, it will be contended that the conclusion to our discussion is essentially in agreement with Aristotle, and, further, that the modern solutions of the paradoxes all converge, surprisingly enough, upon the Aristotelian solution.

I shall, in approaching the paradoxes, follow Ushenko in restricting the discussion to two forms of the traditional paradoxes: (i) the "dichotomy," (ii) the "arrow."[1] A further simplification will be made by showing that these paradoxes may in turn be reduced to one, which may properly be called the "Arrow Paradox."

I. STATEMENT OF THE PROBLEM

The Arrow Paradox arose originally out of what appeared to be an obvious and self-evident theory of change and the implications of that theory in connection with theories of time.

[1] Cf. Andrew Ushenko, "Zeno's Paradoxes," *Mind*, Vol. LV (1946), pp. 151–165. It perhaps should be said, as a matter of terminology, that Ushenko discusses the paradox which we shall call the "dichotomy" under the name of "race," after he has attempted to show that the two are actually variations of one paradox. The race between Achilles and the tortoise, starting from time-0 and lasting until time-2, when Achilles catches the tortoise, can be reduced, as Ushenko remarks, to the series, in units of time or distance, "1, ½, ¼, ⅛, . . ." by choosing a frame of reference relative to which the tortoise is at rest. However, I can not agree with Ushenko that this series is "essentially the same" as the "dichotomy" series, ". . . , ⅛, ¼, ½, 1." For if in a unit time Achilles traverses the distance from his starting point, 0, to half the run course, 1, then certainly he can repeat this feat and, in another unit time, go from 1 to 2. (How and with what velocities any other beasts get to 2 is irrelevant, as Ushenko's "relativity" solution shows.) If it be objected that he must traverse half the distance between 1 and 2 first, and then half between 1½ and 2, etc., one can counter that, rather, he must traverse half the distance between 0 and 1, and before that, half of that half, etc. The argument is valid only if it shows, as does the "dichotomy," that an *initial* motion is impossible; since, if he can move *any* finite distance at all, as the "race" admits, he can repeat that motion, measuring off such units, and finally attain the goal.

If we confine our attention to physical events in the spatio-temporal continuum, *change* may be defined as the difference between two material configurations defining two temporal stages in a spatio-temporal event. The two temporally separated configurations are arbitrary "cuts" in the temporal dimension of the event. Now a paradox arises when we say that the temporal dimension is either (i) *infinitely divisible,* or (ii) *divisible into indivisible consecutive moments.* The paradox arising from (i) will be seen to be essentially the "dichotomy," and that from (ii) the traditional "arrow" paradox. The reduction of the two paradoxes to one may be effected in a third concept of time as (iii) *divisible into an infinite series of indivisible moments.*

If the temporal dimension of the event is (i) *infinitely divisible,* we shall seem to say that since you can never, in a consideration of initial change, compare the given configuration of the event at the initial moment *m* with the configuration at the first subsequent moment *n* because there is always an *n-1* moment in between at which time there is an equally determinate configuration, *change,* which can be defined only in virtue of a temporal set *m* and *n,* can not be initiated; i.e., how change begins is inconceivable. That is, change has been defined as the difference between the character of the spatial configuration at *m*-time and its character at the subsequent *n*-time. But we can never find a *first* *n*-time, since time is infinitely divisible. Thus we can not get ourselves imaginatively *out of* *m*-time. We know as a matter of fact that the change does take place, but we can not account for its taking place on what appear to be self-evident theories of time and change.

Before considering the second alternative, that time is divisible into consecutive indivisibles, compare how the above difficulty has been stated by Aristotle in another way: ". . . that which has changed must have been changing and that which is changing must have changed, and a process of change is preceded by a completion of change, and a completion by a process: and we can never take any stage and say that it is absolutely the first." [2]

In other words, an entity determinate at *m*-time is said *to change* when its determinacy, positional or qualitative, has altered at a subsequent *n*-time. But at *n*-time it has already changed. Thus, in order to say that an entity is changing we find ourselves having to say that it has already changed. This curious nature of change can be put most concisely by saying, with Aristotle, that change has an end but no beginning.[3] Change has no beginning, for when something is said to change, it must already have reached

[2] *Physics,* 237[b], 3–6; cf. 235[b], 6 ff.

[3] Cf. *ibid.,* 236[a], 10–15; 237[b], 22; 235[b], 26 ff.

the second stage of definiteness by reason of which it may be conceived of as changing. But if the change is consummated at the second stage, then the change must have taken place *in between* the two stages. Thus, if there is not a second stage, there can not be initial change, hence no change at all.

Now, on the other hand, if the temporal dimension of the event is (ii) *divisible into indivisible consecutive moments,* we can consider the initial change to be defined by the difference between the configuration at the initial moment and at the *next,* or second, moment of time. But then we must draw the absurd conclusion that the change, which took place between our first two moments, actually took place in no time at all. This is a re-statement of the traditional arrow paradox. If we revert back to our first theory of time, and say that there is always time between any two moments, and thus that there is no *next* moment just subsequent to the first, we start an infinite regress through presupposed stages, unable to get ourselves out of the first stage. There *must* be a *next,* or second, moment, if there is to be initial change, hence any change at all. And this last consideration seems to preclude the hope for a solution in combining the first two theories of time into (iii) *divisible into an infinite series of indivisible moments.* For in an infinite series (i.e., a compact continuous series), there is always an infinite number of moments between any two; hence there is no *next* moment after the first; and if there is no second, or next, moment, there is equally no initial change.

This conclusion, that whether we consider time as divisible (i) infinitely, or (ii) into a finite series of indivisibles, or (iii) into an infinite series of indivisibles, in any case we can not escape a paradox, has led Aristotelian critics to say that Aristotle failed to answer Zeno by his appeal merely to the infinite divisibility of time and his denial of a consecutive (finite) series of instants as composing time.[4] Before we attempt an answer to this charge, let us rule out, with Aristotle, the second theory as untenable, and reduce the first to the third. To say that time is infinitely divisible is to say that no matter how close we take any two *divisions,* or moments, there is always a divisible time lapse in between; i.e., there are always an infinite number of moments between any two, which is exactly how we define an infinite compact continuous series.[5] And

[4] Cf. Sir David Ross, *Aristotle's Physics,* pp. 71–85. The apparent paradox arising from (iii) and precluding initial change has, of course, been the cause of the discontent with Russell's solution, which we shall discuss subsequently.

[5] Though Aristotle's notion of infinite divisibility of a magnitude or time corresponds to what modern mathematicians mean by "compact continuity," he hesitated to say that the continuous was *divisible into* points or instants, because by "division into" Aristotle meant "into parts," and only lines are

the paradox that there can be no rational account of change if we accept this third theory of time, we shall call the "Arrow Paradox."

Further, it may now be seen that *change* also is not essential to the paradox, as Aristotle notes.[6] Thus Whitehead, following Aristotle, says, "The true difficulty is to understand how the arrow survives the lapse of time."[7] That is, it is not essential that there be any difference between the two material configurations defining two temporal stages in an event. If there be *no* difference between any two stages, then the event will be a singularly undramatic one; the event will be simply the endurance of the configuration. It will be, so to speak, a static event. But the problem as to how the configuration *endures* will be exactly the same as to how the arrow *moves*. For all motion is relative, and, by a proper choice of frames of reference, any specific motion may be "reduced" to a mere *endurance*. The points within a configuration which "merely endure" we say are "at rest" relative, of course, to that configuration. The configuration may in turn be at rest, i.e., it may be part of a more spatially extensive enduring (static) configuration. And since there is no change or rest in a moment, but only in a duration, we may say, as we did in the case of change, that initial rest is impossible because the resting point must reach a second moment in virtue of which it can be conceived of as resting; but there is no *second* moment.

Thus the Arrow Paradox argues not merely against change, but against rest as well; it argues thus against *any* duration, or event, static *or* fluid; i.e., against the passage of time itself. We may now revise Ushenko's statement, and say that the assertion of the Arrow Paradox is, that *If there is time, then there is no time.*[8] The paradox amounts to this: "If there is time, then in the duration from one moment to a subsequent moment there must be an initial time lapse shorter than the duration in question (since, on our theory of time, there are always moments between any two, and any two moments bound a time lapse, or duration); but then, likewise, there must be another duration even less extensive than this supposed 'initial' one. But then this 'initial' duration will not actually be

"parts" of lines, and durations "parts" of time. Points, for Aristotle, are *bounds* of lines, and instants *bounds* of time. But in the compact continuous series, by multiplying the bounds to infinity, we imagine that they have, so to speak, "eaten up" that which is bound.

[6] *Physics*, 263[a], 18–22.

[7] Whitehead, *Process and Reality*, p. 106.

[8] Ushenko's statement was (*op. cit.*), "If there is motion, then there is no motion."

initial; and so on *ad infinitum,* so that there can never be an initial duration, or time, hence no duration, or time, at all."

When stated in this fashion, the reader, I fancy, will feel either that the paradox is a good deal less formidable than it seemed when expressed in terms of change, or else that we have done it an injustice in so stating it. Indeed, if he does not feel *both* of these, he must never have seriously contemplated the matter. For the paradox has been perennially persuasive simply because it has been cloaked in the diverting complexities of change; and one can never do justice to a paradox in attempting to expose it, for its exposition is equally its death. The important point in the exposition is, however, to show just why it has been so persuasive. And in order to see this, we must first of all see the fallacy in our common-sense reasoning about time and change.

II. Discussion

I suggest that the fallacy, which initially gave rise to Zeno's paradoxes, and which further has hindered the comprehension of Aristotle's, *or* the modern, answer, arises almost invariably out of a too literal application of the spatial analogy of a "sliced Bologna sausage" to the nature of temporality.

The fallacy may arise in this fashion: Let us take for our analogy, a four-dimensional, spatio-temporal bologna, selecting one of the infinitesimal slices of the bologna's temporal dimension for the indivisible present, and then considering all the bologna on one side as past time and on the other as future. It should be remembered that the slice in question is what we have called a "moment," and that it is a three-dimensional volume; the "slice" is a cut, or division, in the temporal dimension. This slice, which we have called the "present," is then construed, in virtue of its temporal indivisibility, or "instantaneity," as *static,* or *determinate,* i.e., as simply a spatial configuration of material at an instant, as is the case in the cross section of a three-dimensional bologna (i.e., the two-dimensional cross section of the bologna *is* a static configuration, not of material, but of geometrical figures in a plane). We then further construe *Time* as an eating into the future slices of the bologna, i.e., as a serial progress from static present to static present, or the same thing, from determinate configuration to determinate configuration. Thus to say: (i) that these static "presents" are consecutive is to evoke the traditional arrow paradox; (ii) that they are not consecutive but that there is always an infinite number between any two, is to make change unintelligible: for how then does one get out of the first present, or slice, since there is no *next* slice? That is, we are here asking, How does the

arrow move from one present to another present? And the answer is, that it *doesn't:* the only place the arrow ever is is in *the Present!*

This fallacy of the sliced-bologna, or what I shall call the "Spatial Analogy Fallacy," must be clearly understood and guarded against before the Arrow Paradox can profitably be discussed.

The fallacy consists in neglecting the fact that though the present is *temporally indivisible,* it is not thereby *determinate:* and this is where the spatial analogy breaks down in its application to Time. However, there is an ambiguity here; for to say that *the Present* is indeterminate seems to say merely that it is never the same twice, at two instants, or in Aristotle's phrase, that it is ἀεὶ ἕτερον. But the point is that we recognize that *the Present* is never the same twice by attempting to compare it with some "present" that has perished (and thus define a change), i.e., a configuration still in memory but remembered as once characterizing *the Present*—a *past present,* if you will. This past present is simply a determinate state culled out by the intellect from that settled fact which is the past, but which, in virtue of memory, is still present to the intellect. However, we soon learn that we can not compare this past present with *the Present,* for the latter is always changing (εἰὰ ἕτερον); it is not static or determinate, for it is the locus of all motion and becoming. Thus what actually happens in our recognition of change is that we compare two past presents, one remote and a subsequent, more immediate one. Now these two states are perfectly determinate, static, if you will, aspects of *that which has become.* And it is upon this sort of comparison that we base our notion of change.

It is then assumed that by taking past presents less-and-less remote in time, just as in shaving slices of bologna (approaching from the side we have called the past) closer and closer to that slice we have called the present, we are making an asymptotic approach to some *present present,* that infinitesimal slice of the bologna equally determinate. But, keeping to our terminology here, there is no present present! We have no right to assume that *the Present,* as the locus of motion and becoming, proceeds through a series of instants like that found in the slices of that which has become, and upon which we have based our theory of change. Such an assumption results, as we shall attempt to show, in the postulation of an absolute space and time within which Nature works. And the failure to guard against this common-sense assumption ends inevitably in the Spatial Analogy Fallacy. But let us see what is here being said.

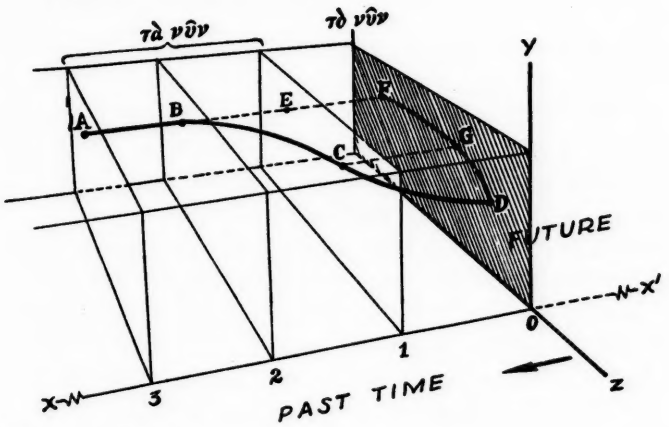
Consider for a moment the arrow, or better, a point *at rest.* Now, as we have seen, it is the time lapse that is important, and a

point at rest requires a time lapse, or duration, just as much as does a moving point. The reason for considering a point at rest is, that it precludes the almost inescapable error of construing the *motion* (change of place) of the point with its "motion," or passage, or survival, through the instants of time. That is, we are apt to ask, as we have above, quite absurdly, "How does the arrow move from one instant to the next?" If we ask this about the point at rest, the notion of *moving* from one instant to the next is seen in its native absurdity. And if we press the inquiry one step further and ask how Time *moves* from one instant to the next, we can begin to see where we have been "taken-in" by our own mental tricks.

I suggest to you, that we have confused the Present with the character of the Past, and I mean by this, the *act of becoming* with *that which has become,* or in Aristotle's words, actuality with potentiality. But if this is to be clearly seen, we must say something more about Time itself. In this discussion we can do no better than to follow Aristotle:

> . . . we apprehend time only when we have marked motion, marking it by "before" and "after"; and it is only when we have perceived "before" and "after" in motion that we say that time has elapsed. Now we mark them by judging that *A* and *B* are different, and that some third thing is intermediate to them. When we think of the extremes as different from the middle and the soul pronounces that the "nows" are two, one before and one after, it is then that we say that there is time, and this that we say is time. For what is bounded by the "now" is thought to be time—we may assume this.[9]

What Aristotle calls "the 'nows'" (τὰ νῦν) we have called above "past presents," and it is in virtue of a comparison of two of these that we recognize and define both rest and change. The following diagram will be useful at this point.



[9] *Physics,* 219ᵃ, 22–29.

The diagram represents a two-dimensional space, in which the frame of reference *yz* and the shaded plane lie, and a three-dimensional space-time, the temporal dimension represented by the axis *xx'*. The line *ABCD* is the life history, or biography, of a point at rest, relative to *yz*, from the time-planes 3 to 2, and moving from *F* to *D* between the time-planes 2 and 0. These time-planes which lie in and divide the volume of the past, and between any two of which there are an infinite number, are what we have called "past presents," and Aristotle calls "*τὰ νῦν*." *The Present* (*τὸ νῦν*) is represented by the shaded plane at time-0. The diagram is misleading in that it represents the Present as determinate, or static, and thus has *D* lying, i.e., *resting*, in it: time has come to a halt, if only it could. In order to regain the so-called "dynamic" nature of time and so imagine *ABCD in the making*, we insert the arrow and imagine the volume of time-planes to be emerging from the shaded plane and passing along *xz* like trays on a moving belt. Further, imagine a phantasmagoria of moving and resting points taking place upon the shaded plane, such that, when a volume of the past emerges, any point at rest and moving from *F* to *D* in the shaded plane will draw a spatio-temporal line *ABCD* in that volume, as in the diagram. This "world-line" *ABCD* will be the biography of a point living in the Present. As a matter of fact, if this living point in question has no memory, it will be in complete ignorance of its own biography, and hence will be unaware of its own motion. However, in virtue of its memory, it recalls its former, or past, position at *B*, projects this position upon the space in which it now lives, and concludes that what it has done during this period of its life is, in terms of space, to move from *F* to *D*. Thus motion is, so to speak, the spatial reflection of active living, where "action" is defined by reference to some *enduring* frame of reference (the *yz* axis).

Definitions: (i) We shall call the *drawing* of the line *ABCD* the "act of becoming."

(ii) We shall call the *drawn* line *ABCD* "that which has become."

(iii) The spatial aspect, or component, of the act of becoming, i.e., the drawing of *FD*, we shall call "motion."

(iv) When the act of becoming has no spatial component (e.g., as in the drawing of *AB*) we shall call it "rest." The convertibility of motion and rest relative to various frames of reference witnesses the derivative nature of space from events. "Spatiality" is derivable in virtue of reiteration of determinate relations between the created entities through some quantum of time. This is represented in the diagram by the emerging of "similar" planes (two-

dimensional spaces) from *yz*. Apart from this reiteration a "frame of reference," and hence motion, would be meaningless. In the projection of *B* upon *yz* there is the presupposition that *yz*, present space, has essentially the same character as past space, i.e., that the character of space is uniform and meaningful without reference to time. The notion of "absolute space" arises from the unguarded use of this abstraction of space from events.

(v) The spatial component of that which has become will be called the "course," or "line," of motion: *FD* in the diagram. When, relative to us, there is no discoverable spatial component, or spatial *course*, of that which has become, i.e., when the point has rested, we hesitate to call that act an "event," or to say that anything has "become." That is, we usually construe becoming as an act resolvable into motions relative to us, and that which has become as a point's (or points') *change in space* relative to us. Thus we think of becoming as taking place *in space*, and find it difficult to imagine that three-dimensional space is itself a creature of Nature's act of becoming; i.e., we find it difficult to think of space as an abstraction, or derived, from events. We hypostasize space into an absolute pre-existing framework within which the act of becoming takes place. This is justified in the sense that all acts of becoming perpetuate this framework. Further, we add to this pre-existing framework another dimension, that of time, and imagine that it is within this four-dimensional (*three* in the diagram) continuum, which is actually *that which has become*, that the act of becoming takes place. Thus common sense imagines becoming as the moving of points (*a*) from one position in absolute space to another, and/or at least (*b*) from one temporal position, or instant, to another. The diagram above is also misleading in this respect, in that we are apt to imagine a volume of spatio-temporality on the right side of *yz* waiting to be "run through." For this reason we have not represented any volume extending into the future, and have imagined the past to be *emerging from yz*. The tendency to think of becoming as "motion and rest in absolute space" can not be corrected by attending to any spatial diagram like the one above. In fact, we have had to imagine becoming, i.e., the drawing of *ABCD*, to be done by the rest and motion of a point from *F* to *D* while the volume of the past is emerging. Whereas, as a matter of fact, motion and rest are derivatives from the act of becoming. However, in virtue of the convertibility of any motion into rest by the proper choice of frames of reference, we can restrict our discussion to the vague notion of "endurance" in time, and hence to the temporal dimension. And here our diagram *is* adequate to expose the common-sense fallacy which occasions the Arrow Paradox.

Allowing, then, that the act of becoming takes place *in* present Space, our diagram shows that the shaded plane *yz*, i.e., *the Present*, is the locus of this act.

(vi) We shall call the volume of past-planes emerging from *yz* (a volume which is a perfectly determinate record of that which has become) the "spatio-temporal, extensive continuum." This volume is "extensive" because it has four dimensions (three in the diagram); and it is a continuum because it is infinitely divisible along any dimension.

(vii) We shall call the temporal dimension of this continuum, "physical time," represented in the diagram by *AF* (or along the *xx'* axis).

(viii) We shall call the spatial dimension of this continuum "physical space," represented in the diagram by the past planes. Thus physical space and physical time have the same sort of relation as the breadth and width of a cube have to its length. They are both abstractions from the concrete nature of that which has become.

Now the act of becoming, whose locus is the shaded plane *yz*, does not take place in physical time. Thus it is meaningless to say that there is any act, motion or rest, along *ABCD* or *AF*. In other words, the dynamic "from-to" notion is completely meaningless in reference to that which has become, to physical time or physical space, i.e., to the extensive continuum. A point in this continuum is simply *at* some position *at* some instant of physical time: and an event, or world-line *ABCD*, is an infinite compact continuous series of such "at-at's." In short, the line *ABCD* is a creature, and the complexes of such lines constitute the extensive continuum, i.e., the continuum is the "spatialization" and "temporalization" of becoming. The world-lines *sustain* space and are temporal; they do *not* traverse spatio-temporal loci. Nature does not retreat in time and traverse her creatures. The world-creature, the extensive continuum, is past and gone, perfectly determinate and creatively dead, potentially divisible into an infinity of points and instants. And it is meaningless to ask how any point moves either (i) from one spatial position to the next,[10] or (ii) from one instant

[10] In normal discourse, certainly, it is meaningful to say that an entity moves from one point to another in space; but it must be remembered that in such statements we tacitly assume an absolute space, or *timeless* space which we have, consciously or unconsciously, constructed by "telescoping" into one, as it were, all the instantaneous spaces of the time series. The movement consists in being at different positions in different instantaneous spaces (assuming the different spaces are sufficiently homologous to admit saying that a point in one space is in a different position from a point in the other space). Only when we assimilate all the instantaneous spaces into one timeless space,

to another. Our neglect of the creature aspect of space in the identification of past space with present space, the notion of "absolute space," lends the former question an air of validity; and for this reason the choosing of a frame of reference relative to which the point in question is at rest, and hence restriction of the discussion to the second question above, is helpful to the imagination in seeing the fallacy of the paradoxes.

Temporal extensiveness is a property of physical time only. Instantaneity is an ideal of diminution of extent of the line, or duration, which is physical time: it is an abstraction from physical time (i.e., it is temporally non-extensive) just as a point is from a line (i.e., the point is lengthless). An instant is a bound of physical time just as a point is a bound of a line; and two such bounds define a duration. If the drawing of any world-line is spatially reflected as a motion, then the two instants temporally bounding the world-line define a *change*. Every temporal line, or duration, is infinitely divisible, so that, by definition, there is no such thing as an *initial change*. In conclusion, it is meaningless to say that the Present, the locus of the act of becoming, is either durative or instantaneous, terms which have reference only to physical time and its divisions. In Whitehead's phrase, "physical time expresses some features of the growth, but *not* the growth of the features." [11] There is no absolute, serial time stretching into the future and awaiting its traversal by Nature.

It is now clear why our theory of *change*, and to a lesser extent that of rest, lent cogency to the Arrow Paradox; for change, spatial and temporal, is a character of the creatures constituting the extensive, infinitely divisible, continuum. And to insist that Nature must proceed through units of change, is to say that creation must traverse her creatures, that time must traverse time, and space space.

Only on the Newtonian, or some more bald, assumption of an absolute time stretching out with its durations and moments into the future can the question as to how something *gets*, or *advances*, or *endures*, from the present instant to some next instant be properly asked. We must conclude, with Aristotle, that time is simply a measure of one of the extensive characteristics of Nature's creatures, and that it is no more self-existing than is the bound of a physical body. The fact that there is no *next* moment after any

past space into present space, does it become meaningful to say that motion takes place *in the same space*. Such a simplification is useful for expressing natural properties, but, unless we know what we are about, is apt to lead to paradoxes.

[11] *Process and Reality*, p. 434.

given moment is no more paradoxical than the fact that there is no *next* point on a line after the end point. Time does not *move* or *advance;* nor does an object move in, or *within,* time. Time, as a number, is the measure of endurance. And if a thing is "in time" it has endured, and relative to some frame of reference has either moved or rested. Motion "through time," or a "flowing time," are the "ghosts of the old Absolute Time banished from physics but still haunting philosophical literature." [12]

The anomaly of the act of becoming is that, in its creation of continuity (physical time and space), it is engaged in the generation of the dead; for that which is temporally extensive is necessarily past, perished and gone from the present fact of Nature. However, through all instants of the past, or slices of the dead, the one character of "three dimensionality" runs, and thus betrays a type of "framework" within which Nature works. But it must be remembered that this framework is also of her own making, no less than is physical time. *The present,* the locus of the act of becoming, is analogous to an instant because it is, so to speak, a bound of physical time; it is the bound between past and future time, but it is a bound, as Aristotle says, which is ἀεὶ ἕτερον—a *fluid* bound which is also the source of physical time. When we scrutinize its creatures, we recognize that this creative, fluid bound proceeds through atomic acts of becoming, or events like the drawing of world-lines. More concretely, it proceeds from potentiality to actuality, from the matter to the form. At each stage there is the becoming of something which stands as the ὕλη of subsequent becoming. This ὕλη, or potentiality, is simply that which has become, and which we find in the inheritance of future occasions from their

[12] Any discussion of Time must first make clear what is going to be meant by the phrase "in time." I have followed Aristotle: to be in time is to be measured by time (*Physics,* 221ᵃ, 8–9: τὸ ἐν χρόνῳ εἶναι, τὸ μετρεῖσθαι αὐτῶν τὸ εἶναι ὑπὸ τοῦ χρόνου) and to be contained, or bounded by time (*loc. cit.,* 28: τὰ ἐν χρόνῳ ὄντα περιέχεσθαι ὑπὸ χρόνου). This means that the only thing which can be in time is that which has become, a four-dimensional creature. To say that the act of becoming is in time, or takes place in time, if it could mean anything on this definition, would require an absolute time which bound the stretches (or moments) of that act and through which the act advanced. In this way the assumption of absolute time is apt to slip into the very language with which we are explicitly decrying it. Something of this sort serves to obfuscate and vitiate much of an otherwise admirable discussion of time by W. W. Hammerschmidt in his recent work, *Whitehead's Philosophy of Time.* Compare such unfortunate phrases as, ". . . the penetration of time into the future cannot be by instantaneous facts" (cf. pp. 34–37); "The advance of time is, then, the becoming of fact which makes a finite advance in time . . ." (p. 31); ending in a strange reversal of Whiteheadian doctrine: ". . . the physical pole makes time, and the subjective aim is only in time."

past. But the important point is that this continuity, or potentiality, is not to be construed as a pre-existing framework within which becoming takes place. The act of becoming lies, so to speak, *outside* the extensive continuum of space and time. And to mistake an analysis of the character of that continuum, of that which has become, or ὕλη, for the act of becoming, is to mistake the potential for the actual, and in this "misplaced concreteness" to raise insoluble problems for philosophy. In summary, in Whitehead's words, "the creature is extensive, but its act of becoming is not extensive." Or, "Continuity concerns what is potential; whereas actuality is incurably atomic."

III. Conclusion

This discussion, which has purposely been kept on a high level of geometric abstraction, has professed to show only wherein the fallacies of thinking which give rise to the Arrow Paradox lie, *not* to give an adequate account either of the nature of the extensive continuum or, most of all, the act of becoming. For example, the diagram was employed for convenience in exposition and as an aid to the imagination, not as an assumption that there is an invariant time series. On the contrary, it could be shown to deny this, in accordance with relativity theories. For a more technical discussion of the theory of spatio-temporal extension, which has scarcely been touched upon here, I refer the reader to two excellent books by A. N. Whitehead, *The Concept of Nature* (1920) and *The Principles of Natural Knowledge* (1919).

Russell's notion of the non-consecutivity of instants and his theory that motion in the spatio-temporal continuum consists simply in being *at* different positions *at* different times, have been upheld. However, with the correction of the tendency to think of this spatio-temporal continuum as an absolute and pre-existing framework within which becoming takes place, the common-sense notion of conceiving motion and rest in terms of "from-to" has been explained and rendered harmless. This denial of absolute space incorporates Ushenko's "relativity" solution of the race paradox by showing that, in his words (*op. cit.*), "the language of space-time does not allow us to speak of the *same* track, i.e., the same line, at two different moments." Space thus becomes a derivative from the complex of world-lines, or, more concretely, from events. The world-line is space in the making, not the traversing of pre-existing absolute space. Further, since the world-line is equally physical time in the making, or, otherwise stated, since physical time is the "temporalization of becoming," the act of becoming does not *advance* through a temporal continuum, i.e., *from* instant *to* instant;

and the Arrow Paradox is resolved. Again, Aristotle's statement that *change*, which "takes place" only in the extensive continuum, has an end but no beginning, has been confirmed. And, finally, Bergson's appeal to *la nature intime du mouvement* may be put down as a valid emphasis upon our immediate experience, since we are creatures living in the creative Present. Motion and rest are spatial reflections relative to some frame of reference sustained by the act of becoming, and thus are convertible.

I conclude with the statement, a detailed defence of which can not be given here, that the foregoing discussion has been little more than (to give a new twist to Whitehead's phrase) "footnotes to Aristotle." Aristotle did not think that there was any paradox in the conception of time as infinitely divisible, or in the fact that there was no initial change, because he had not fallen under the spell of materialism. He did not mistake the potential for the actual, or the temporal and spatial dimensions of matter, of that which has become, for the paths of time, or of rest and motion. He did not, as did Democritus and modern science, mistake ὕλη for that present, creative fact of Nature which has within itself ἡ ἀρχὴ κινήσεως καὶ στάσεως.

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COMMENTS AND CRITICISM

A NOTE ON LEWIS'S ANALYSIS OF THE MEANING OF HISTORICAL STATEMENTS

The thesis that the meaning of any statement is to be found in its consequences in experience has been one of the contributions of the pragmatic school of philosophy. In *An Analysis of Knowledge and Valuation* Lewis applies this pragmatic rule to the meaning of empirical statements.

Most of the statements we make belong to what Lewis calls the "third class" of empirical statements, which he defines as follows:

> Third, there are non-terminating judgments which assert objective reality; some state of affairs as actual. These are so named because while there is nothing in the import of such objective statements which is intrinsically unverifiable, and hence nothing included in them which is not expressible by some terminating judgment, nevertheless no limited set of particular predictions of empirical eventualities can completely exhaust the significance of such an objective statement.[1]

[1] Lewis, C. I., *An Analysis of Knowledge and Valuation* (La Salle, Ill.: The Open Court Publishing Company, 1946), p. 184.

Statements about the historical past come under this class of non-terminating judgments. This creates the paradoxical situation that the meaning of a statement about the past like "Caesar died" is to be found in an infinite series of statements whose verification lies in the future. To quote Lewis:

> . . . the statement of this objective belief must be translatable into terms of passages of possible experience, each of which would constitute some partial verification of it; that is, it must be translatable into the predictive statements of terminating judgments. [P. 189.]

Lewis, recognizing the anomaly of a past event being signified by future events, meets the objection as follows:

> The trouble is that the objector—quite naturally, perhaps—understands us to be affirming that the past event of Caesar's death really is something belonging, in piece-meal fashion, to future time, as certain events of verification. But we intend no such patent absurdity: we are speaking of meaning in the sense of intension, for which two empirical statements have the same meaning if each is deducible from the other. [P. 198.]

He then uses the example of the two statements "Yesterday was Monday" and "Tomorrow will be Wednesday" to explain how a statement about the past can have the same reference as a statement about the future:

> Yesterday isn't tomorrow and a Monday isn't a Wednesday; and we have identified the sense in which "Yesterday was Monday" speaks of something to which "Tomorrow will be Wednesday" does not refer. But either of these two statements does refer to what the other refers to in the sense of implying what the other implies. Each of them thus signifies the *same state of affairs:* what either of them requires to be the case in order to be true is exactly and completely the same as what the other requires to be the case; anything which decisively verified the one would decisively verify the other, and whatever confirms the one must in equal measure confirm the other also. [P. 199.]

I do not think, however, that the example cited by Lewis is pertinent to the discussion of the meaning of historical statements: "Yesterday was Monday" and "Tomorrow will be Wednesday" do not state a historical fact and a future verification respectively in the sense in which we are talking about historical fact. As Lewis is using them, they are not empirical statements at all, but statements which are connected by some sort of analytic relation. The relation between "Yesterday was Monday" and "Tomorrow will be Wednesday" is analogous to the relation between "The integer immediately following one" and "The integer immediately preceding three," where no temporal relation exists.

The words "was" and "will be" in "Yesterday was Monday" and "Tomorrow will be Wednesday" do not mean that the ob-

jective facts signified have a temporal reference to past or future. That tomorrow will be Wednesday is not an empirical consequence or verification of the fact that yesterday was Monday—it is the logical consequence of the fact that the days of the week are named in a certain serial order, namely, Monday, Tuesday, Wednesday, Thursday, etc. So, given any day, one can logically deduce the temporal connection of that day with any other day of the week, without undertaking any empirical verification procedures.

But the case of a historical statement and any predictive statement which would verify the historical statement is quite different: they are not related analytically or logically, but only empirically. Let us take an example of what Lewis's view would entail: Consider the statement "Caesar was assassinated." According to Lewis this means

(1) "If I read Plutarch's *Lives*, I would read his account of Caesar's death."
(2) "If I looked under 'Julius Caesar' in *Encyclopedia Brittanica*, I would read of his assassination."
(3) "If I read Shakespeare's *Julius Caesar*, I would read a similar account."
(4) "If....., I....." *ad. inf.*

Obviously the relation of the statement "Caesar was assassinated" to any of the verificatory statements is not the same as that between "Yesterday was Monday" and "Tomorrow will be Wednesday." The truth of the statement "Caesar was assassinated" does not logically or necessarily imply the truth of any of the succeeding statements. The most one can say is that the truth of the latter statements is an empirical eventuality of the truth of the historical statement. The truth of the verifying statements is not deducible from "Caesar was assassinated" but is contingent on a great number of empirical eventualities—in the first example, that Plutarch existed, that he wrote the *Lives*, that the book is extant, and that I exist, etc.

Still less could one deduce from "If I read Plutarch's *Lives*, I would read his account of Caesar's death," the truth of the statement "Caesar was assassinated,"—it could conceivably have happened that Caesar really committed suicide and that Plutarch's account is not true. In other words, what either of the statements requires to be the case is *not* the same as what the other statement requires to be the case, as in Lewis's example of Monday and Wednesday. Only if one wanted to hold the strictest kind of

metaphysics in which one event necessarily determined all succeeding events, could one maintain that the cases are similar.

Lewis tries to solve the problem by insisting that the historical statement of objective fact and its verifying statements are equivalent in that they signify the same "state of affairs," rather than the same objective reality: "Not only is the past event of Caesar's death a different chunk of reality from any space-time slab belonging to the future, but nothing that any human knower can ever determine in future with theoretical certainty will be quite equivalent to the fact that Caesar died at a certain past time." [2]

He distinguishes "states of affairs" from "objective reality" as follows:

> . . . An individual object is a space-time slab; and is something which we can no more know, in all its infinite specificity, than we can similarly know the whole of reality: on that point the doctrine is on firm ground. But what we know in the sense of apprehending as fact or believing with assurance, is merely some limited state of affairs, which exhausts neither reality nor the object to which cognition is addressed, but comprises only those factualities about the object which our knowledge of it would enable us to state. [P. 55.]

This still does not get him out of the difficulty, however—the state of affairs indicated by the objective statement and that by the verification are different since the objective realities of which the states of affairs are but limited aspects are different.

In terms of Lewis's own explanation of his example, one can see why the concept of a "state of affairs" does not solve the problem. "Yesterday was Monday" and "Tomorrow will be Wednesday" obviously are equivalent to "Today is Tuesday." Lewis explains why they both signify the same state of affairs: "Since they have the same logical consequences and the same intension they must also signify the same *state of affairs*" (p. 199). However the statement "Caesar was assassinated" and its verifying statements are not logically deducible from each other and do not have the same logical consequences, and thus Lewis's analysis does not apply.

The class relations involved in the two cases also show the difference between them. "Tomorrow will be Wednesday," "Yesterday was Monday," are both subsumable under a definition of the days of the week and any given statement such as "Today is Tuesday." But if, according to Lewis, an objective statement is equivalent to an infinite number of predictive statements, they could only be subsumable under some all-inclusive state of affairs which would be the whole universe.

[2] *Op. cit.*, p. 200.

The discussion would indicate that there is a distinction between the meaning of a historical statement and its modes of verification. This is a peculiarity of historical statements, for the difficulty does not arise in statements about present objective fact, which can be successfully analyzed as Lewis suggests.

To take a trivial example, suppose one has the present experience of a round red spherical object which leads one to make the statement "This is an apple." On Lewis's analysis the meaning of this objective statement consists in an infinite number of predictive statements which would verify the objective statement. For example:

(1) "If I bite it, it will taste sweet."
(2) "If I cut it in half, I shall find seeds in the core of it."
(3) "If I touch it, I shall have the tactile sensations I usually have when presented with apples."
(4) "If I apply certain chemicals to it, certain specific results will occur."
(5) "If I....., ... *ad. inf.*

The important point to note here is that all these predictions signify procedures which directly verify the original objective statement. In the case of present objective fact one has the opportunity of undertaking direct action and obtaining immediate and conclusive verification of the empirical statement. Thus it makes good sense to say that the meaning of an empirical statement is equivalent to an infinite number of verifying predictions in the case of a present objective fact.

Historical statements represent a very different situation, however: It is impossible to verify directly the statement "Caesar was assassinated" by going back to ancient Rome and experiencing the event. All our modes of verifying statements about the past are indirect—we have to rely on the testimony of documents, relics, etc., all of which are remote from the subjects of the historical statements. There is a breach between the meaning of an historical statement and its modes of verification which makes Lewis's analysis inadequate.

Thus it would appear that the pragmatic theory of the meaning of empirical statements has definite limitations, for it does not offer a satisfactory account of the meaning of statements about the historical past. Since such statements represent a class which is too extensive to be ignored, we seem to be in need of an enlarged analysis of empirical statements.

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BOOK REVIEW

Existence and Inquiry. A Study of Thought in the Modern World. OTIS LEE. Chicago: University of Chicago Press. 1949. ix + 323 pp. $4.00.

This volume serves a double purpose: it is both an introduction to types of philosophic thought and a critique of current philosophy. A beginning student could read and understand most of it and would acquire from it a sense not only of the methods of philosophic thinking, but also of the difficulties, ambiguities, and confusions which are actually troublesome today. Very skillfully Professor Lee presents successively the methods of analysis, dialectic, and pragmatism in their historical settings, their aims, their achievements, and their failures. It is evident from this book even to those who did not know him personally that in Otis Lee's untimely death, Vassar College suffered the loss of an extraordinary teacher, whose acumen and candor led his students to appreciate the real problems of philosophy in all their seriousness and intricacies without bewildering them or making methodology an end in itself. If it were nothing else, this volume would be a noteworthy demonstration that it is possible to reduce philosophy to its elements without making it elementary.

But the book is also addressed to the author's colleagues in the profession of systematic thinking and it brings together so much important criticism of important issues that it deserves to be studied carefully for its own contribution to philosophy. There is a single thesis underlying the whole work; a point of view emerges in it, which arouses in the reader the wish that this were the beginning of Otis Lee's career instead of its end. For seldom does a philosophic essay seem so fertile in fresh ideas and careful discriminations. Had he lived to carry out the enterprise which he sketches in this work, the author would undoubtedly have given us a major system of methodology and metaphysics. But even as it is, this work is a living monument and will stimulate fruitful discussion for years to come.

The first part is a composite portrait of analytic method, or of what Lee calls "the classical tradition's search for certainty." He shows how the problems of existence have been twisted by modern analysis, both rationalist and empiricist, to appear to be problems of knowledge. The result is not only the distortion of metaphysical analysis, but a scepticism which, unlike classical scepticism, separates essence from existence. The primary problem of analysis is to reveal "the evident," but instead of achieving evidence or arriving at "facts," analysis has broken up into pre-

occupation with the logical problems of self-evidence, immediacy, and data. Instead of going in the directions of Hegel or of Hume, Lee would go in the direction of historical analysis, seeking in historical knowledge a clue to the nature of both fact and existence.

The second part, on dialectic, discusses the nature of opposites, both in existence and in thought; it contains an extended critique of the theory of negation, and ends with an account of the significance of the discovery of process. This account closes with the following paragraph, which states the basic theme of the whole work:

> So far as knowledge is concerned, the conclusion to which we are driven by the discovery is that man exists in a perspective. The philosophical problem of knowledge will lie in man's relation to his perspective. The problem of the two logics can be solved only by shifting the discussion from knowledge to reality. And, so far as reality is concerned, structure is the proper sphere of logic; process, so far as it is more than structure, must be dealt with not by a second logic but in other terms. [P. 187.]

The third part is a critique of pragmatism, by far the best I have seen anywhere. Lee begins by pointing out the obvious fact that pragmatism, in its reaction against dialectic, tried to get along without a theory of existence or nature, and that it assimilated logical processes to biological. He then shows the differences between genetic and experimental methods. One of his best analyses is his critique of the exploitation of genetic method by the social theories of the nineteenth century, and his defense of an experimental approach to historical knowledge. However, his major concern in this section on pragmatism is to show clearly how practical and theoretical (logical) consequences can be distinguished and related. This leads him to the final section on the relation of fact to value.

To this survey of philosophic methods Lee adds his own conception of what philosophy ought to be. It ought to be a type of knowledge and hence aim at truth and have a theoretical interest, but it ought not to be theory about abstractions. It should make "concrete entities" its subject-matter and thus relate its theory to present practice. His conception of philosophy is summarized in two noteworthy passages:

> The aim of action is to bring about a harmony of real existence and ideal values, actualizing intelligent ends through the use of appropriate means. In this way, theoretical and practical interests should be united, and it is the function of philosophy to describe and make vivid their complementary relation, to connect scientific knowledge with the prophetic visions of art and religion. In place of a separation between reality and the world of the imagination, it proposes a fruitful union between knowledge of existence and insight into possibilities. Philosophy is disciplined vision, practical ideal-

ism; and its task is both critical and constructive. It must criticize the habits and dispel the inertia which hold men in the clutch of the past. And it must provide positive goals of action, by interpreting the results of science in their significance for all the aspects of human life. [P. 268.]

The limitations imposed by class and culture are simply the instances which happen to be most striking to us of a perspectival character inherent in the nature of existence itself. That is why the problems of ideology and cultural relativism are so insistent. They are expressions in human society of an ultimate trait of reality and therefore must be numbered among the basic problems of philosophy. . . . By an analysis of the present from within, we must attempt to formulate concepts having general validity. There is no other course. The suggestion that we should try to get outside the present is an impossible one and could have meaning only for a fundamentally mechanistic point of view; it has never been taken seriously by any important thinker. Such an analysis would aim at a description of the nature of the present and the categories contained within it. But to undertake it, a theory of inquiry and knowledge different from any that we have examined is needed. [Pp. 306–307.]

Unfortunately we shall never know what this new "theory of inquiry and knowledge" was to be. Only a few clues are given in this volume. It is to take "concrete existents" or "individual existence" as the objects of inquiry. It is to "discover aspects of existence which are not themselves existents" (p. 307). And it is to formulate these aspects in terms of categories, first principles, or contexts, which will at the same time define the existential perspectives of the "concrete entities."

However, the general direction which Lee would have taken is indicated clearly enough. Existence and inquiry must be interpreted as aspects of a single process and unified in a naturalistic, historistic, relativistic philosophy.

There are two adjectives in addition to "concrete" which Lee uses frequently to qualify "existence." He speaks of "real existence" and of "present existence" repeatedly, without giving us an adequate idea of what these adjectives mean. His theory of the "present" is roughly indicated and leads us to think that he wanted to carry out what Mead began, but failed to develop, in his *Philosophy of the Present*.

But Lee's meaning of "real existence" is left quite vague. He speaks occasionally as a realist, but his theory of knowledge, as here developed, scarcely fits into any known brand of realism. His realism was probably more metaphysical than epistemological. In any case, his use of these terms indicates what the work as a whole exhibits, namely, an independence of mind and originality of viewpoint which make it extremely profitable reading.

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BOOK NOTES

Studies in Philosophy and Science. MORRIS R. COHEN. New York: Henry Holt & Company. 1949. vii + 278 pp. $4.50.

Contact with the mind of Morris Raphael Cohen meant a great deal to me. Many a time a shrewd, common-sense comment, thrown out effortlessly, has enabled me to see through some uncriticized assumption I was making, or upset some careless habit of thought I had taken over from others. But more to me than any detail was a point of view. Here was an empiricist who looked at the facts themselves. Things are what they are, why should we wish to be deceived? But he was also a rationalist, a rare person in these days of cloudy emotion. The new logicians were immersed in symbols, the empiricists in what they thought were given data, but Cohen was conscious of a structure, not in symbols merely, but in the world itself. So was Spinoza, but Cohen was a new type of rationalist, one not too impressed by tight systems and necessities. To see anything rationally was to see it as one possibility among others, to judge it to be thus and so was also to consider what would be the case if it were not so. To understand a proposition was to understand the meaning of its contradictory. To do thinking was to see what is essential in a situation, what is relevant, what are the invariants, and what are the possibilities and potentialities. Faced by a new situation one can thus think out a new synthesis, and that is why intelligence is pragmatically so valuable. But it would be valuable even if the situation offered, in point of fact, no immediate way out; one can still condemn brute fact as arbitrary happen-so. Not merely philosophy but also science works in a realm of the possible; the first law of Newton is nowhere actually realized. Spinoza was liberated by perceiving the necessity in things; this new rationalism of Morris Cohen's was even more liberal in that it perceived the contingency in things.

Here I am asked to review a final sheaf of Cohen's philosophical essays. I wish there were more yet to come. Yet in them, as in his *Reason and Nature,* I do not find overtly expressed the views I have outlined above. At least it seems to me he has seldom expressed in print that which to me made him so different. These are papers written from time to time, some a little dated, some with minor inaccuracies, always giving the impression that you are listening to a wise and thoughtful man. But the new illuminating insight that makes you stop short in your tracks and reconstruct your own thinking to meet the challenge is so rarely found here that it troubles me. The later papers are the best, I think, particularly the one on Hegel and the brilliant criticism of Dewey. The sum-

mary of his views in the paper reprinted from *Contemporary American Philosophy* (1931) comes nearer to doing him justice than any of the rest. He may not have been exactly a religious man in any orthodox sense, but here is portrayed a true worshipper of the ideal.

H. T. C.

Power and Personality. HAROLD D. LASSWELL. New York: W. W. Norton and Company. 1948. 262 pp. $3.00.

This study of power in relation to personality is directed toward "the more perfect instrumentation of democratic values" (p. 9). The reader will find many insights provided he is not limed in terminology. Power, defined as any decision-making in interpersonal activity, is for convenience limited to those decisions where disobedience involves severe deprivations. As the "economic man" deals through the market, the power-seeker—the *homo politicus*—is completely oriented to the power position and potential of the "political arena." While no such completely political man exists, the political type accentuates power to compensate for deprivations to the self. Professor Lasswell calls for social "self-observatories" in which the psychiatrist and historian, the political scientist and sociologist, would pool their resources to help eliminate social anxieties that generate despotism.

In criticism, it may be said that the "configurative method" proposed for social investigation seems too diffuse for coöperation among social sciences, since it embraces such varied principles as goal thinking, derivational thinking in terms of highly abstract principles, trend thinking, scientific thinking, and projective thinking. Terms and definitions also create difficulties, for the written findings of the social sciences, such as this book itself, move precariously between the essay and the scientific monograph. The suggestion for establishing social self-observatories has promise, for such institutions would be more likely to work out adequate methods than academic centers of learning.

The view of democracy set forth is an uneasy combination of a "general will" stressing shared values and a contract stressing mutual self-interest. The "interpersonal" relations of democracy need to be further divided into the personal relations of coöperative living and the impersonal necessities that call for government. Professor Lasswell's interesting discussion of the way that anxiety and failure in the "primary circle" of family and personal contacts create power possibilities on the national level illustrates the importance of such a distinction between personal and impersonal social relationships. Otherwise the utilities of government may be lost in the search for a community of power.

The extension of psychoanalytic techniques for which this book speaks is probably more useful negatively in locating and removing social repressions than in finding positive social goals. The approach most likely to further democracy is summed up in the author's injunction to "reduce provocation." We can believe with him that it is possible to "subordinate power to the service of respect." Therefore this book may be regarded as a search for policies which will "hinder hindrances" not only in political life but in the process of personality formation itself. The social sciences could set themselves no worthier task.

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NOTES AND NEWS

The Peirce Society will conduct a Conference at Columbia University on the afternoon and evening of November 4, 1949. The papers to be presented are as follows: "Aspects of Peirce's Phenomenology" by David Savan; "Fourthness" by Herbert W. Schneider; "The Monad: Relativity of Non-Relativity" by Charles Hartshorne; "Peirce on Abduction" by Paul Weiss.

The Annual Business Meeting will be held at Clark University, in conjunction with the meeting of the Eastern Division of the American Philosophical Association, in December. Any persons desiring to know more concerning the activities of the Peirce Society should communicate with its secretary, Frederic H. Young, 77 Edgemont Road, Upper Montclair, New Jersey.

The third meeting of the Mountain-Plains Philosophical Conference will be held at Colorado College, Colorado Springs, October 13–15, 1949. The General Topic is "Relations between Theory and

Practice." The following papers will be read: "General Considerations on the Relations between Theory and Practice in Culture Analysis" by Sterling McMurrin; "Philosophy and World Order" by Clifford Murphy; "Science and Morals" by David Hawkins; "The Professions and Professionalism Today" by Ernest Lauer.

A Conference on the Teaching of Philosophy will be held at Western Reserve University, Cleveland, Ohio, October 14–15, 1949.

At the morning session on October 14 the subject will be "Introducing the College Student to Philosophy," with the following papers: (*A*) Types and Trends in General Introductory Courses, Primarily Elective—"Learning to Philosophize" by L. W. Norris; "Introductory Philosophy: Analysis or Synthesis?" by H. H. Titus; "Student Developed Courses" by Ethel Tilley. (*B*) Types and Trends in Required Introductory Courses—"Philosophy and Citizenship Education" by Earl Edgar; "The Function of Philosophy in a General Education Program" by L. K. Zerby; "Philosophy as Integrator of a Liberal Arts Program" by Troy Organ; Seminar Discussion. At the afternoon session the subject will be "The Teaching of Ethics" with the following papers: "The Relation of Ethics to Social and Policy Sciences" by W. A. R. Leys; "The Teaching of Formal Ethics" by Abraham Edel; Seminar Discussion. In the evening the papers are: "The Present Situation in Teaching Opportunities and Outlook" by L. W. Beck; "A Survey of the Teaching of Philosophy: J. H. Melzer; "The First Twenty-five Years: A Concluding Unscientific Postscript" by Brand Blanshard.

On October 15, the subject of the morning session is "The Teaching of Logic and Scientific Method" with the following papers: "The Teaching of Logic as a Formal Science" by J. G. Brennan; "Elementary Logic as Functional and Remedial Logic" by L. E. Hahn; "The First Logic Course" by Lionel Ruby; Seminar Discussion. At the afternoon session the subject is "The Teaching of the History of Philosophy" with papers as follows: "Teaching the History of Philosophy" by George Boas and Warner Wick; Seminar discussion. Following this will be a final plenary session on "Teaching Philosophers to Teach Philosophy." The papers are "Teaching Teachers to Teach," by A. C. Benjamin; "The Teaching of Philosophy in Boston University" by E. S. Brightman; and a paper on "The Function of an Annual Conference on the Teaching of Philosophy" by J. A. Irving.